# Multimedia resources as a complementary tool of teaching and learning. Case study of a game designed to teach immunology contents.

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# New Technologies in Education

- Since 2000 the University of Porto is concern about integrating educational technologies in the teaching and learning process.

- The unit for New Technologies in Education (NTE or GATIUP) is part of the Digital University Department and was created in 2003 as a strategy of the University to enable and encourage initiatives of open and distance learning.

- The implementation of a project like this in a traditional and large like University of Porto was (and is) a complex process.

  - ✓ About 29.000 students; 15 schools with autonomy; 69 scientific research units

- Mission of the unit is to provide several services to all the teachers working with educational technologies.

# NTE activities

- Direct support to all the teachers that combine face-to-face classes with on-line component;
- Teachers training;
- On-line tutoring;
- LMS management (Moodle);
- Technical support to online assessment;
- Development of multimedia contents;
- Videoconference, telepresence and streaming.

# Multimedia development service (1/2)

- Multimedia: two or more digital contents in a single application (video, graphics, animation, simulation, audio, text...).
- In the last years the development of educational multimedia contents is one of the most relevant activities at the office.
- NTE is a multidisciplinary team (8 persons).
- The multimedia development is made by 4 persons.

# Multimedia development service (2/2)

- As the number of teachers using Moodle platform increase, the teachers started to feel the need of “improve" the learning contents available.

- Multimedia resources can be seen as a new “type of learning”, allowing students:

  - ✓ Autonomy
  - ✓ Continuous training
  - ✓ Self-assessment

- In the last years the number of teachers interested in multimedia contents grew and the number of requests increased.

# Multimedia development process (1/2)

- **How to manage the number of requests?**

  (1) On-line form;

- **How to know what is possible to be developed?**

  (2) Teaching purpose and relevance (learning objectives);

  (3) Reusability of the contents;

  (4) Expertise and available personal.

# Multimedia development process (2/2)

- **1st stage** – evaluation of the request.
- **2nd stage** – if approved, it will be allocated to one element of development team (number of developers depends on the type of content and workload).
- **3rd stage** – work meeting (developer/teacher): definition of the concept, collection of materials and definition of scenarios.
- **4th stage** –implementation/development of resources.

# Immunology game (1/8)

- A good example of a relevant multimedia educational content: a simulation developed by NTE, teachers and students of Basic Immunology from the Faculty of Medicine.

- Shows how multimedia resources can be a pedagogical tool for sudents self-training and knowledge development.

- Positive feedback obtained from teachers and students with this simulation.

# Immunology game (2/8)

## Background

- Immunology Department from the Faculty of Medicine is responsible for the undergraduate medical education in the field of immunology both to medical and dentistry students.

- Provide students the knowledge of how the immune system develops, how the body defends itself against diseases and what happens when it all goes wrong.

# Immunology game (3/8)

**Methodologie**

- 1 hour lectures (twice a week)
- 90 minutes of seminars (every other week).
- Final grade based on a final examination (0 to 20) and adjusted with students performance in seminars and on-line quizzes.

# Immunology game (4/8)

**Proposal**

• Based on a work made by students, in the academic year of 2007/2008, the teachers presented a proposal:

- ✓ Develop a web-based knowledge games on immunology contents for third-year medical students;
- ✓ Compare the performance of students that had contact with the games with students that only had access to the classical lectures.

# Immunology game (5/8)

## Game development

- Between 2008 and 2009 were developed 3 games.
- The first was “Who wants to B a lymphocyte?”

  (1) Adobe Flash 8;

  (2) Simulation of a board game;

  (3) Played with a virtual dice and “B cell-pawns”;

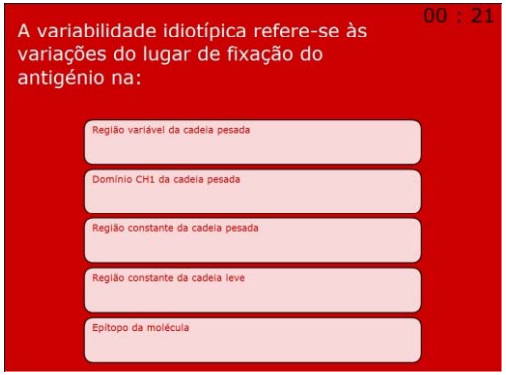
  (4) Maximum 3 players - not at remote points but in the same computer.

# Immunology game (6/8)

**How it works?**

- Game board contains 55 squares, the goal is to reach first the final square;
- The players roll the dice moving their pawn according to the number rolled;
- Whenever a player lands on a green square (there are 16) has to provide the correct answer for two questions in 30 seconds each;
- The questions are sort randomly from a database of 80 questions elaborated by the students and revised by teachers.





# Immunology game (7/8)

**Game results**

- Students were randomly allocated into lecture (LG) and game (GG) groups.

  - ✓ LG – consisted of an exposition of 60 minutes and during that time students were able to discuss the subjects.
  - ✓ GG - played for 45 minutes and teachers did not intervene.

# Immunology game (8/8)

**Game results**

- An evaluating quiz based on 28 questions of immunology text-books was administered before and after the intervention.
- Changes in scores were statistically compared:
  - ✓ Improvement in number of correct answers of the quiz after the lecture and the game in both groups;
  - ✓ However, the mean increase was significant higher in the LG.

# Conclusions

- "Who wants to B a lymphocyte?" - from feedback obtained and from the experience done with the students it clear that this tool when used autonomously and regularly can improve students knowledge in some complex learning contents.

- The use of multimedia resources is now growing in many educational areas, however nobody can deny the importance that face-to-face classes still have.

- NTE intend to increase the number of teachers using multimedia resources, however we know that we can't produce contents without specific learning objectives or reusability concerns (quality vs quantity)

- AND we still belive that is important to question facts like costs, human resources needs, and the real impact they have in students learning process (trace of outcomes).

# Thank you!

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